

REMARKS

In the May 11, 2005 Office Action, the Examiner withdrew the prior indication of allowable subject matter and rejected the claims over a new combination of references. As explained in more depth below, Applicants respectfully submit that the withdrawal of allowance and subsequent rejections are erroneous. Accordingly, it is respectfully requested that the rejections be withdrawn and the claims allowed.

Applicants will address the Examiner's objections and rejections in the order in which they appear in the Office Action.

Claim Objections

In the Office Action, the Examiner objects to Claims 11, 13, 14, 19, 21, 22, 27, 29 and 30 for an informality therein and requests that the word "weight" be inserted between "low" and "molecular" in each of these claims. As Applicants have amended each of these claims accordingly, it is respectfully requested that this objection be withdrawn.

Claim Rejections - 35 USC §103

Claims 4, 5 and 11-34

The Examiner also rejects Claims 4, 5 and 11-34 under 35 USC §103(a) as being unpatentable over Suzuki et al. (JP 2001-043976) in view of Mueller et al. (US 6,316,786). This rejection is respectfully traversed.

More specifically, in the Office Action, the Examiner asserts that Suzuki discloses an electroluminescent layer substantially having the same complex as claimed but admits that Suzuki fails to disclose a red luminescent compound (i.e. a guest material) such as DCM1,

DCM2 or DCJT is included in the luminescent layer. The Examiner then cites Muller and contends that the reference teaches that each of DCM1, DCM2 or DCJT are well known luminescent dopants. Therefore, the Examiner asserts it would have been obvious to one of ordinary skill in the art to have included one of DCM1, DCM2 or DCJT in the luminescent layer of Suzuki because Suzuki generally teaches emissive dopants (DPVBi) may be included and Muller teaches DCM1, DCM2 and DCJT are well known dopants for an emissive layer.

In support of this rejection, the Examiner contends that the complex of Suzuki is further doped with a fluorescent compound in Example 5 (para. 33). Hence, the Examiner is assuming that the complex is a host material and the fluorescent compound is a guest material.

The Examiner's assumption, however, is incorrect. In particular, Suzuki does not explicitly disclose that the complex is further doped with a fluorescent compound. Instead, Suzuki merely discloses "As a luminous layer 4, the compound which are the distyryl arylene derivative (DPVBi) shown in formula 7 and a quinolinol metal complex (1) was used..." [0033]. Hence, Suzuki does not explicitly disclose which material functions as host or guest. This can be ascertained by studying the energy transfer.

In the present invention, energy is transferred from the complex (the host material which emits green light and has higher energy) to the red luminescent compound (the guest material which emits red light and has lower energy), as the light emitted by the guest material is used as the luminescent color. See e.g. page 14, lines 9-13 and page 23, lines 18-19 of the present application.

In contrast, the compound DPVBi of Suzuki has a maximum fluorescence wavelength (λ_{max}) of 470 to 490 nm (which emits blue light and has higher energy) while the quinolinol metal complex (1) has a maximum fluorescence wavelength (λ_{max}) of 540 to 580 nm (which

emits green light and has lower energy). Since energy transfers from a higher energy level to a lower energy level, it is believed that the energy of DPVBi transfers to the quinolinol metal complex (1) and the quinolinol metal complex (1) emits light. Therefore, it is believed that the quinolinol metal complex (1) is a guest material because it is believed that the energy from the host material (DPVBi) transfers to the guest material (the quinolinol metal complex (1) to emit light). Hence, the DPVBi is not an emissive dopant (guest material) because the DPVBi does not emit light, but instead, the quinolinol metal complex (1) emits light and would be the guest material. Therefore, it would not be logical to substitute the luminescent dopants of Muller for the DPVBi host material of Suzuki.

While Applicants traverse this rejection and believe that the above explanation distinguishes the cited references from the claimed invention, in order to advance the prosecution of this application and to make this distinction clear, Applicants are amending independent Claims 4, 5, 11, 12, 19, 20, 27 and 28 to clarify the host material and the guest material.

For example, amended independent Claim 4 recites “a light emitting layer containing a guest material and a host material containing a complex of a Group 4 metal of the periodic table represented by the general formula [Formula 1]” ... “wherein the guest material has an emission wavelength with a maximum value within a range of 580 to 680 nm.” Hence, the guest material is used as a dopant material, and the guest material emits light. See also e.g. page 1, line 29 to page 2, line 3 of the present application. Further, the guest material is a red luminescent compound (wavelength in a range of 580 to 680 nm can be observed as a red emission), and the complex is used as a host material. See e.g. page 3 line 28 to page 4 line 7 of the present application.

Therefore, it is improper to combine the references of Suzuki and Muller to substitute the red luminescent compound of Muller for the DPVBi of Suzuki to arrive at the claimed invention, because the DPVBi of Suzuki is *not* an emissive dopant (a guest material) and Muller merely discloses a red luminescent compound (a guest material) such as DCM1, DCM2 or DCJT as well known dopants. Hence, the combination of references is improper, and the cited references fail to disclose or suggest the claimed electroluminescent element of independent Claim 4 of the present application. Therefore, independent Claim 4 is patentable over the cited references.

For similar reasons, the rejection of Claims 5 and 11-34 is improper, and these claims are also not disclosed or suggested by the cited references but are patentable thereover. Accordingly, it is respectfully requested that this rejection be withdrawn.

Claims 6 and 10.

The Examiner also rejects Claims 6 and 10 under 35 USC §103(a) as being unpatentable over Suzuki et al. in view of Littman et al. (US 5,405,709). This rejection is also respectfully traversed.

More specifically, the Examiner contends that Suzuki discloses an electroluminescent layer substantially having the same complex as claimed but admits that Suzuki fails to disclose that the layers emit white light. The Examiner, however, contends that Littman teaches that it is possible to produce an organic electroluminescent device that emits white light by combining fluorescent materials emitting different colors. The Examiner then contends that it would have been obvious to one of ordinary skill in the art to have selected a fluorescent dopant for the luminescent layer of the Suzuki device resulting in the emission of white light because Littman teaches white light emission may be obtained by combining different emitting materials.

While Applicants traverse this rejection, in order to advance the prosecution of this application, Applicants are amending independent Claim 6 to recite the electroluminescence layer emits a white light by stacking a first layer which emits a blue light, a second layer which emits a green light, and a third layer which emits a red light wherein the second layer and the third layer have a complex of a Group 4 metal of the periodic table represented by the general formula [Formula 1]. See e.g. page 23, line 30 to page 24, line 1 of the present application. The structure of the electroluminescent element of Claim 6 is advantageous in that the complex of a Group 4 metal can be used in the second layer and the third layer to make production easier. Id.

In contrast, neither Suzuki nor Littman disclose or suggest that the complex of a Group 4 metal is contained in both the second layer and the third layer, wherein the second layer emits a green light and the third layer emits a red light. Further, neither Suzuki nor Littman disclose or suggest emission of white light by stacking the second layer and third layer with a first layer which emits a blue light.

Therefore, Claims 6 and 10 are not disclosed or suggested by the cited references but are patentable thereover. Accordingly, it is respectfully requested that this rejection be withdrawn.

New Claims

Applicants are also adding new dependent Claim 35 which recites that the complex of a Group 4 metal in the second layer is a guest material and that the complex of a Group 4 metal in the third layer is a host material.

Applicants are enclosing the \$50.00 fee for the new claim. If any further fee should be due for this new claim, please charge our deposit account 50/1039.

Accordingly, it is respectfully requested that this new claim be entered and allowed.

Conclusion

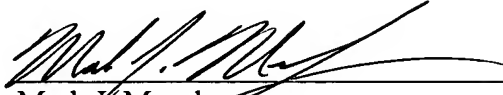
It is respectfully submitted that the present application is in a condition for allowance and should be allowed.

If any further fee should be due for this amendment, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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